

*To:* Jesse Robinson, DOW  
*From:* Ray Ihlenburg  
*Re:* Bardstown WTP AI No. 3245  
*File:* 41265  
*Date:* March 16, 2009

*cc:* Larry Hamilton, PE

#### Reference Sheets C-04, C-10

**Anticipated Grade Change** – The design closely matches the *existing grade* at the inlet and outlet of the 60-inch diameter storm pipe. We compared the profile along the existing ditch (as a guide) to our proposed alignment since it does not follow the existing ditch. We determined that the overall slope was actually being decreased by the proposed design. The existing stream profile had an average slope of 6.35% and the steepest section had a slope of 13.7%. The average slope on the proposed storm pipe is 4.89% with the steepest slope being 10%.

**Protection of Downstream** – The design incorporates 20 LF section of KYTC Class II channel lining at the outlet headwall to dissipate the energy and prevent scour. This is followed by 58 LF of earthen 4' flat bottom ditch that ties into the existing ditch to the stream. The use of the channel lining and the 4' flat bottom earth ditch and the gentle slope of the earth ditch will slow the flow and should not to disturb anything farther downstream.

**Sizing of the Downstream Features** – This is based on our experience using KYTC Class II channel lining. 20 LF is suitable for pipe discharging at less than 5% grade. The last section of the 60-inch diameter storm pipe is at 4.88%.

In a further effort to control velocity and make sure there is ample capacity in the pipe due to the nature of the structures above, we up-sized the pipe from 48", which would carry the forecasted maximum flow from the 70-acres tributary to the culvert, to the proposed 60" diameter. We also did this to account for the chance that future development within the 70-acres of tributary land (around the airport) would not increase runoff flow exceeding the capacity of a 48" diameter storm pipe.